CLAIMS

1. (currently amended) A method of measuring and recording operational boundaries for a gas turbine engine, the operational boundaries utilized by a controller associated with the gas turbine engine, the method comprising:

determining a first burner dome to be adjusted in said gas turbine engine for a first burner mode;

upwardly adjusting a ring flame temperature at said first burner dome in said gas turbine engine so as to determine a maximum ring flame temperature operational boundary for said first burner dome upon determination of one or more of: lean blowout conditions, exceeded predefined liner and dome metal temperature limits, combustion dynamic pressures, and emissions limits, with the determined maximum ring flame temperature operational boundary representing a maximum ring flame temperature to be permitted by the controller;

recording into memory a plurality of parameters from a plurality of sensors coupled to said gas turbine engine operating at said determined maximum ring flame temperature operational boundary;

downwardly adjusting said ring flame temperature at said first burner dome in said gas turbine engine so as to determine a minimum ring flame temperature operational boundary for said first burner dome upon determination of one or more of: lean blowout conditions, exceeded predefined liner and dome metal temperature limits, combustion dynamic pressures, and emissions limits, the determined minimum ring flame temperature operational boundary representing a minimum ring flame temperature to be permitted by the controller;

recording into memory a plurality of parameters from said plurality of sensors coupled to the gas turbine engine operating at said determined minimum ring flame temperature operational boundary;

subtracting a minimum ring flame temperature corresponding to said minimum ring flame temperature operational boundary from a maximum ring flame temperature corresponding to said maximum ring flame temperature operational boundary to determine a temperature

window size;

defining a nominal ring flame temperature by calculation from the minimum and maximum ring flame temperatures when said temperature window size is greater than a predetermined minimum window size, the nominal ring flame temperature representing a specified normal ring flame temperature under normal operating conditions;

adjusting the ring flame temperature in said first burner dome to said nominal ring flame temperature; and

recording into memory a plurality of parameters from said sensors coupled to the gas turbine engine operating at said nominal ring flame temperature.

2. (original) The method of claim 1, further comprising:

before said determining said first burner dome to be adjusted, adjusting a bulk combustor flame temperature from said gas turbine engine until readings from said plurality of sensors coupled to said gas turbine engine are within predetermined operating limits.

3. (original) The method of claim 2, wherein said readings from said plurality of sensors include a NOx emissions level; and

said adjusting said bulk combustor flame temperature includes:

increasing said bulk combustor flame temperature in said gas turbine engine if said NOx emissions level is less than a predetermined lower limit NOx emissions level.

4. (original) The method of claim 2, wherein said readings from said plurality of sensors include a CO emissions level; and

said adjusting said bulk combustor flame temperature includes:

increasing said bulk combustor flame temperature in said gas turbine engine if said CO emissions level is greater than an upper limit CO emissions level.

5. (original) The method of claim 2, wherein said readings from said plurality of

sensors include a NOx emissions level; and

said adjusting said bulk combustor flame temperature includes:

decreasing said bulk combustor flame temperature if said NOx emissions level is greater than a predetermined upper limit NOx emissions level for said gas turbine engine.

6. (original) The method of claim 2, wherein said adjusting said bulk combustor flame temperature includes:

decreasing said bulk combustor flame temperature if said bulk combustor flame temperature is greater than a predetermined upper limit bulk combustor flame temperature.

7. (original) The method of claim 2, wherein said readings from said plurality of sensors include a high pressure turbine outlet temperature; and

said adjusting said bulk combustor flame temperature further includes:

decreasing said bulk combustor flame temperature if said bulk high pressure turbine outlet temperature is greater than a predetermined upper limit high pressure turbine outlet temperature.

8. (original) The method of claim 2, further comprising:

activating an alarm if said adjusting said bulk combustor flame temperature is performed a number of times greater than a predetermined number of times.

9. (previously presented) The method of claim 2, further comprising:

repeating said adjusting said bulk combustor flame temperature if a NOx emissions level at said maximum temperature operational boundary is less than a predetermined upper limit NOx emissions level and said temperature window size is less than said predetermined minimum window size.

10. (previously presented) The method of claim 2, further comprising:

repeating said adjusting said bulk combustor flame temperature if a NOx emissions level at said minimum temperature operational boundary is less than a predetermined upper limit NOx emissions level and said temperature window size is less than said predetermined minimum window size.

11. (previously presented) The method of claim 2, further comprising:

repeating said adjusting said bulk combustor flame temperature if a high pressure turbine outlet temperature at said maximum temperature operational boundary is less than a predetermined upper limit high pressure turbine outlet temperature and said temperature window size is less than said predetermined minimum window size.

12. (previously presented) The method of claim 2, further comprising:

repeating said adjusting said bulk combustor flame temperature if a high pressure turbine outlet temperature at said minimum temperature operational boundary is less than a predetermined upper limit high pressure turbine outlet temperature and said temperature window size is less than said predetermined minimum window size.

13. (previously presented) The method of claim 1, further comprising:

activating an alarm if a NOx emissions level at said maximum temperature operational boundary is greater than a predetermined upper limit NOx emissions level and said temperature window size is less than said predetermined minimum window size.

14. (original) The method of claim 2, further comprising:

repeating said adjusting said bulk combustor flame temperature if a high pressure turbine outlet temperature at said nominal ring flame temperature is greater than a predetermined upper limit high pressure turbine outlet temperature.

15. (original) The method of claim 2, further comprising:

repeating said adjusting said bulk combustor flame temperature if a NOx emissions level at said nominal ring flame temperature is greater than a predetermined upper limit NOx

emissions level limit.

16. (previously presented) The method of claim 1, further comprising:

activating an alarm if a NOx emissions level at said minimum temperature operational boundary is greater than a predetermined upper limit NOx emissions level and said temperature window size is less than said predetermined minimum window size.

17. (previously presented) The method of claim 1, further comprising:

activating an alarm if a high pressure turbine outlet temperature at said maximum temperature operational boundary is greater than a predetermined upper limit high pressure turbine outlet temperature and said temperature window size is less than said predetermined minimum window size.

18. (previously presented) The method of claim 1, further comprising:

activating an alarm if a high pressure turbine outlet temperature at said minimum temperature operational boundary is greater than a predetermined upper limit high pressure turbine outlet temperature and said temperature window size is less than said predetermined minimum window size.

19. (original) The method of claim 1, wherein said determining said first burner dome to be adjusted includes:

selecting said first burner mode in a lookup table to determine a sequence of burner domes to be adjusted for said first burner mode; and

selecting said first burner dome from said sequence of burner domes to be adjusted.

20. (original) The method of claim 19, wherein said selecting said first burner dome includes:

setting a flag to identify an adjusted burner dome in said plurality of burner domes to be adjusted for said first burner mode.

21. (previously presented) The method of claim 1, wherein said adjusting a ring flame temperature at said first burner dome in said gas turbine engine to determine a maximum ring flame temperature operational boundary includes:

incrementing said ring flame temperature at said first burner dome in said gas turbine engine by a predetermined amount; and

detecting the activation of a acoustics and blow out avoidance logic.

22. (previously presented) The method of claim 1, wherein said adjusting a ring flame temperature at said first burner dome in said gas turbine engine to determine a maximum ring flame temperature operational boundary includes:

incrementing said ring flame temperature at said first burner dome in said gas turbine engine by a predetermined amount to achieve an incremented ring flame temperature;

recording into memory a plurality of parameters from said plurality of sensors coupled to said gas turbine engine operating at said incremented ring flame temperature; and

repeating said incrementing if said plurality of parameters are within predetermined acoustics and blowout boundaries.

23. (previously presented) The method of claim 1, wherein said adjusting a ring flame temperature at said first burner dome in said gas turbine engine to determine a maximum ring flame temperature operational boundary includes:

incrementing said ring flame temperature at said first burner dome in said gas turbine engine by a predetermined amount to achieve an incremented ring flame temperature;

recording into memory a plurality of parameters from said plurality of sensors coupled to said gas turbine engine operating at said incremented ring flame temperature; and

repeating said incrementing if said plurality of parameters are within predetermined acoustics and blowout boundaries and said ring flame temperature at said first burner dome is less than a predetermined maximum ring flame temperature.

24. (previously presented) The method of claim 1, wherein said adjusting a ring flame temperature at said first burner dome in said gas turbine engine to determine a minimum ring flame temperature operational boundary includes:

decrementing said ring flame temperature at said first burner dome in said gas turbine engine by a predetermined amount; and

detecting the activation of a acoustics and blow out avoidance logic.

25. (previously presented) The method of claim 1, wherein said adjusting a ring flame temperature at said first burner dome in said gas turbine engine to determine a minimum ring flame temperature operational boundary includes:

decrementing said ring flame temperature at said first burner dome in said gas turbine engine by a predetermined amount to achieve an decremented ring flame temperature;

recording into memory a plurality of parameters from said plurality of sensors coupled to said gas turbine engine operating at said decremented ring flame temperature; and

repeating said decrementing if said plurality of parameters are within predetermined acoustics and blowout boundaries.

26. (previously presented) The method of claim 1, wherein said calculating said nominal ring flame temperature includes:

incrementing said ring flame temperature at said minimum ring flame temperature operational boundary by a predetermined amount.

27. (previously presented) The method of claim 1, wherein said calculating said nominal ring flame temperature includes:

decrementing said ring flame temperature at said maximum ring flame temperature operational boundary by a predetermined amount.

28. (previously presented) The method of claim 1, wherein said calculating said

nominal ring flame temperature includes:

averaging said ring flame temperature at said maximum ring flame temperature operational boundary and said ring flame temperature at said minimum ring flame temperature operational boundary.

29. (original) The method of claim 1, further comprising:

determining a second burner dome to be adjusted for said first burner mode when said high pressure turbine outlet temperature at said nominal ring flame temperature is less than a predetermined upper limit high pressure turbine outlet temperature and a NOx emissions level at said nominal ring flame temperature is less than a predetermined upper limit NOx emissions level.

30. (original) The method of claim 1, further comprising:

receiving input indicating a new burner mode if all burner domes for said first mode have been adjusted.

31-90. (cancelled)